

Having described the invention, what is claimed is:

- 1        1. A ball ramp actuator for use as a locking mechanism, the actuator comprising:
  - 2            a first cam plate having at least one groove providing a non-circumferential ball
  - 3            ramp;
  - 4            a second cam plate rotatable with respect to the first cam plate, and having at least
  - 5            one groove providing a non-circumferential ball ramp, the ball ramp of the second cam
  - 6            plate intersecting with the ball ramp of the first cam plate when viewed axially;
  - 7            a ball positioned between the first and second cam plates, in the grooves of the first
  - 8            and second cam plates; and
  - 9            biasing means for biasing the ball radially to ensure that the ball follows the non-
  - 10          circumferential ball ramps of both cam plates in response to relative rotation of the two
  - 11          cam plates.
- 1        2. A ball ramp actuator according to claim 1, wherein the grooves become
- 2        shallower as they extend radially outward such that radially outward movement of the ball
- 3        spreads the cam plates apart.
- 1        3. A ball ramp actuator according to claim 1, wherein the biasing means
- 2        comprises a ball retainer in contact with the ball and having resiliently deformable portions
- 3        that serve as integral springs.
- 1        4. A ball ramp actuator according to claim 1, wherein the biasing means
- 2        comprises a ball retainer with a pocket within which the ball is located.

1       5. A ball ramp actuator according to claim 1, wherein the biasing means  
2   comprises a ball retainer with a flexible arm in contact with the ball.

1       6. A ball ramp actuator according to claim 1, wherein the biasing menas  
2   comprises a ball retainer with a concave surface in contact with the ball such that the ball is  
3   centered with respect to the ball retainer.

1       7. A ball ramp actuator according to claim 1, wherein the biasing means  
2   comprises a ball retainer made of an elastically deformable polymer.

1       8. A ball ramp actuator according to claim 1, wherein the number of balls is three.

1       9. A ball ramp actuator according to claim 1, wherein the number of balls is more  
2   than three.

1       10. A ball ramp actuator according to claim 1, wherein the grooves include at least  
2   one spherical recess to provide a detent for maintaining the ball in a locked or unlocked  
3   position.